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S P E C I F I C A T I O N

WIND-DRIVEN TWIN TURBINE

BACKGROUND OF THE INVENTION

The field of the invention is electrical generation and the invention relates more particularly to wind-driven electrical generation.

Wind has been used to drive machinery for centuries, but recently with the concern of greenhouse gas buildup, use of wind to generate electricity has received increasing interest. Wind generation is commercially used in many parts of the world and the most common style of commercial wind turbine generator utilizes a rotor, typically with three blades. The rotor typically turns a horizontally oriented shaft, which provides input to a gear box, which increases the rotation speed and turns a generator which converts the shaft power into electrical power. Usually, the pitch of the blades can be adjusted to regulate the speed during normal operation and also to shut down the machine when wind speeds are excessive. Most modern wind turbines start operating when wind speeds reach about 12 miles per hour and achieve their rated power at about 25-30 miles per hour and shut down at wind speeds above 35-40 miles per hour.

Unfortunately, a great deal of potential power generation is lost because of the necessity of shutting down the windmill in

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1 wind speeds above 35-40 miles per hour. Wind turbines which do
2 not use rotor blades have been patented but have not found
3 commercial application. One such design is shown in U.S. Patent
4 No. 4,764,683. The generator uses a pair of helical rotors
5 positioned so that a portion of the blades extend beyond forward
6 and rear "nacelles."

7 A vertical axis wind-powered generator is shown in U.S.
8 Patent No. 5,038,049. This device uses a cylindrical rotor
9 having a vertical axis with a plurality of wind-driven veins. A
10 curved inner modulator is mounted on the base inside the rotor to
11 control the wind flow through the rotor. An inlet modulator is
12 rotatably mounted on the base for controlling wind flow to the
13 rotor.

14 BRIEF SUMMARY OF THE INVENTION

15 It is an object of the present invention to provide a wind-
16 driven turbine which is capable of generating electricity without
17 having to shut down in winds in excess of 40 miles per hour.

18 The present invention is for a wind-driven turbine assembly
19 useful for the generation of electricity. The assembly has a
20 frame with a front opening for the entrance of the flow of wind
21 and the frame has a floor, a right side, a left side, and a back.
22 A right and a left turbine are rotatably supported by the top and
23 floor of the frame. Each of the right and left turbines have a
24 vertically oriented central support pipe having a plurality of

1 air passageways therethrough. A plurality of blades are held by
2 each of the vertically oriented support pipes and the blades are
3 generally vertically oriented and extend outwardly to an outward
4 edge so that as each turbine rotates its outer edge subscribes a
5 circle within the frame. Each such circle has an outer edge
6 oriented near the respective right side and left side of the
7 frame. Each central support pipe has an upper and a lower end
8 support frame for providing support means for holding the support
9 pipe in a vertical position and at least one of the upper and
10 lower end support frame has openings to permit the flow of air
11 outwardly from an inner area of the support pipe. A nose cone is
12 supported vertically in the front opening of the frame, having a
13 rightwardly oriented face and a leftwardly oriented face for
14 diverting the flow of wind away from the center of the front
15 opening to create a right air stream and a left air stream. A
16 right side door and a left side door is each hingedly held across
17 the right and left sides respectively of the frame by a vertical
18 hinge positioned nearer the front opening of the frame than the
19 back opening of the frame. These side doors are movable from a
20 closed position angularly aggressively to let more wind pass
21 between the outer edges of the blades and the respective side
22 doors. Each side door is biased toward the closed position
23 whereby a right side airstream flows against the blades of the
24 right turbine and along the right side door, and a left side
25 airstream flows against the blades of the left turbine and along

1 the left side door, thereby urging the turbines to turn in
2 opposite directions. A back panel is held across the central
3 area of the back of the frame and this back panel, together with
4 the top, bottom, right turbine, and left turbine, form a rear
5 central space. Means are provided for releasing air from the
6 rear central space to the outside of the frame. A right and a
7 left adjustable baffle are held across the back of the frame
8 adjacent the back panel and the right and left adjustable baffles
9 are hingedly held at the right and left edges of the back panel.
10 Means are provided for setting the amount of opening of the right
11 and left adjustable baffles, whereby when a stream of air enters
12 the front opening of the frame, such stream of air is directed by
13 the nose cone into a right air stream and a left air stream.
14 Part of the right and left air streams pass through the air
15 passageways in the vertically oriented central support pipes of
16 the right and left turbines and exit through the support pipe.
17 Electrical generating means are operably connected to the
18 turbines to produce electrical energy. A wide mesh screen is
19 placed over the front opening to prevent the entry of large
20 objects which would interfere with the rotation of the turbines.
21 Baffles may be provided within the frame to direct the flow of
22 air in an optimum manner. Front, right, and left wind baffles
23 may be further provided to control the flow of air into the front
24 opening. The outside diameter of the turbines is typically
25 between 2 and 8 feet, with 8 to 30 blades in each turbine.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view showing the front, top, and right side of the wind-driven turbine assembly of the present invention.

Figure 2 is a top view thereof.

Figure 3 is a perspective view of one of the turbines of the assembly of Figure 1.

Figure 4 is a cross-sectional view taken along line 4-4 of Figure 2.

Figure 5 is a side view of the right turbine of Figure 2.

Figure 6 is a perspective view of the wind-driven turbine assembly of Figure 1 shown on a stand.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The wind-driven turbine assembly of the present invention is shown in perspective view in Figure 1 and indicated generally by reference character 10. Turbine assembly 10 has a frame 11 which has a front opening 12, a floor 13, a left side 14, a right side 15, a top 16, and a back 17. The front opening 12 has a nose cone 18. Nose cone 18 has a leftwardly oriented face 19 and a rightwardly oriented face 20.

Frame 11 is aimed so that the flow of wind enters the front opening 12. Two airstreams, namely a leftward airstream 21 and a rightward airstream 22, are diverted as shown in Figure 2 toward the left and right sides of frame 11.

1 The front opening 12 of frame 11 is covered by a screen 23
2 to keep birds and other objects from entering the front opening
3 12. Front opening 12 preferably has angled faces 20 along the
4 bottom opening, 25 and 26 along the left and right openings, and
5 27 along the top to help direct air inwardly into front opening
6 12.

7 Turning now to Figure 2, left turbine 28 is vertically
8 mounted within frame 11 and has a vertically oriented central
9 support pipe 29 from which a plurality of blades 30 are affixed.
10 As shown in Figure 3, the turbine has an upper end support frame
11 31 and a lower end support frame 32, which support the blades as
12 well as the support and output shaft 33.

13 The vertically oriented central support pipe 29 has a
14 plurality of air passageways 34 which permit the flow of air into
15 the support pipe 29, and there are openings 35 on the top and/or
16 bottom of the frame 31/32 to emit the flow of air from the
17 interior of the support pipe to the exterior of the frame. Right
18 turbine 36 has the identical features.

19 As shown in Figure 2, left airstream 21 is directed by face
20 19 toward the left side 14 of the frame, which supports a left
21 side door 37. Left side door 37 is hingedly connected at 38 to
22 the left side of the frame near the front opening 12. Door 37 is
23 biased toward a closed direction by spring 39 and preferably has
24 an outwardly angled portion 40. As the flow of wind increases,
25 door 37 is forced slightly more open so that excess may pass

1 between the outer circle 41 subscribed by blades 30 and left side
2 door 37. This flow of air turns left turbine 28 in a clockwise
3 direction, as viewed in Figure 2 and indicated by reference
4 character 42. Left airstream 21 exits as indicated by arrows 43
5 and 44.

6 A second control is preferably provided by a pair of rear
7 baffles 45 and 46. Left rear baffle 45 is hingedly connected at
8 hinge 47 to a back panel 48 affixed to the back of the frame 17.
9 A hydraulically or otherwise controlled arm 49 positions left
10 rear baffle 45 and is pinned at 50 to frame member 51.
11 Similarly, right rear baffle 46 is positioned by arm 52 and is
12 operated by hydraulic or other motor means and is pivotally
13 pinned at 53 to frame member 51. The position of the rear
14 baffles helps direct the flow of air out through the side and
15 rear of wind-driven turbine assembly.

16 An inner volume 53 exists between back panel 48 and the left
17 and right turbines. Since air pressure tends to build in this
18 area, an air vent 54, shown in Figure 1, provides an outlet for
19 any such air buildup.

20 Air entering the right side is diverted by face 20 and exits
21 as indicated by arrows 55 and 56. Right side door 57 is hingedly
22 connected at 58 to frame 11 and is biased by spring 59 toward a
23 closed position.

24 The openings in the vertically oriented central support pipe
25 are shown in Figures 3 and 4. In Figure 4 it can be seen that

1 the generators 60 and 61 are positioned below frame 11, which is
2 useful for maintenance for larger wind turbines, being more
3 easily accessed from below.

4 The wind turbine of the present invention can further
5 contain controlled front baffles 67 as shown in Figure 6. Fixed
6 baffles, two of which are indicated in Figure 2 by reference
7 character 63, may be added to further direct the flow of wind
8 through the frame. The blades, as shown in Figure 2, are
9 preferably curved and set at 60° to 90° with respect to the
10 central support pipes. The turbines are anticipated to be
11 capable of being made very large with a size range anticipated
12 between 2 feet and 18 feet in outside diameter with a length
13 between 3 feet and 20 feet. The number of blades per turbine is
14 preferably between 8 and 30 blades with an anticipated minimum
15 top RPM of 140.

16 The function of the holes in the center pipe is to get rid
17 of dead air which forms as the turbines turn. The dead air can
18 pass outwardly to the top of the frame as shown in Figure 4 of
19 the drawings through openings 65 and 66. It is anticipated that
20 in cold climates, deicers utilizing hot water or steam may be
21 used.

22 The present embodiments of this invention are thus to be
23 considered in all respects as illustrative and not restrictive;
24 the scope of the invention being indicated by the appended claims
25 rather than by the foregoing description. All changes which come

133/114

- 1 within the meaning and range of equivalency of the claims are
- 2 intended to be embraced therein.